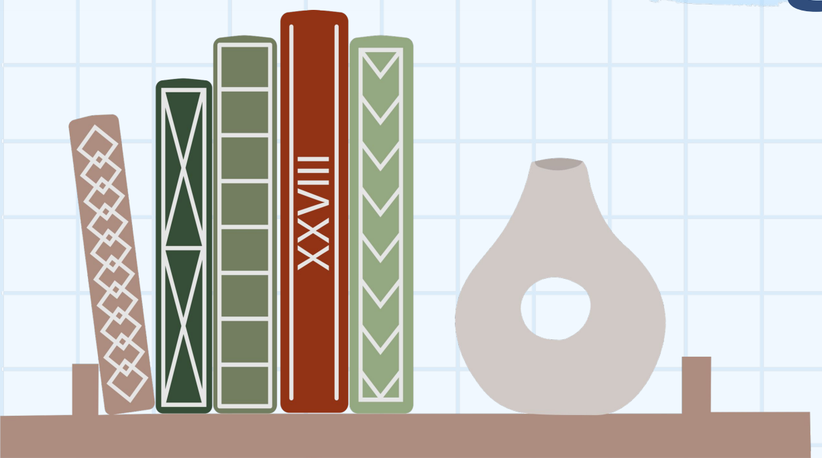
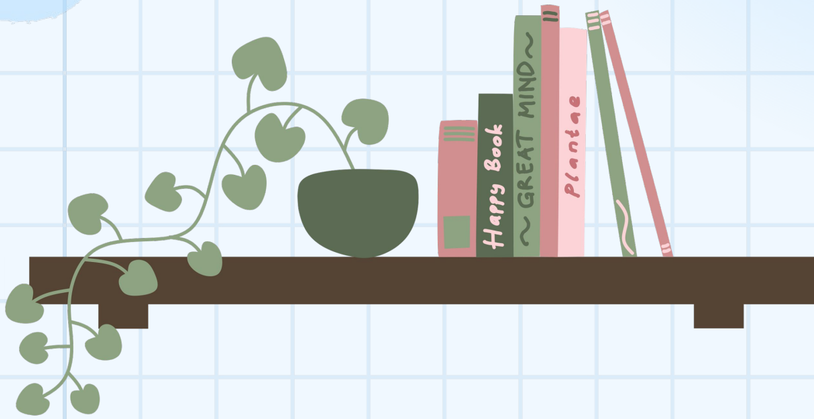
BS./BSC.IN

Applied AI and Data Science

Algorithmic Thinking & its Applications





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Foundations of Algorithmic thinking

- Context & Everyday examples
- Flowcharts & Pseudocodes
- AI Assisted Problem Solving
- Common pitfalls & solutions
- Career applications

DR. DIP SANKAR BANERJEE

Let's dive into and learn:

1. Understanding what an algorithm is.
2. Exploring real world examples.
3. Learning how algorithms power everyday tools.
4. Applying Algorithmic thinking to solve problems.

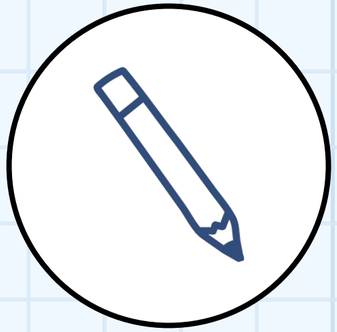
Learning Objectives

Basics of Algorithms

Understand the basics of Algorithms

Everyday Examples

Recognize Algorithms in everyday life



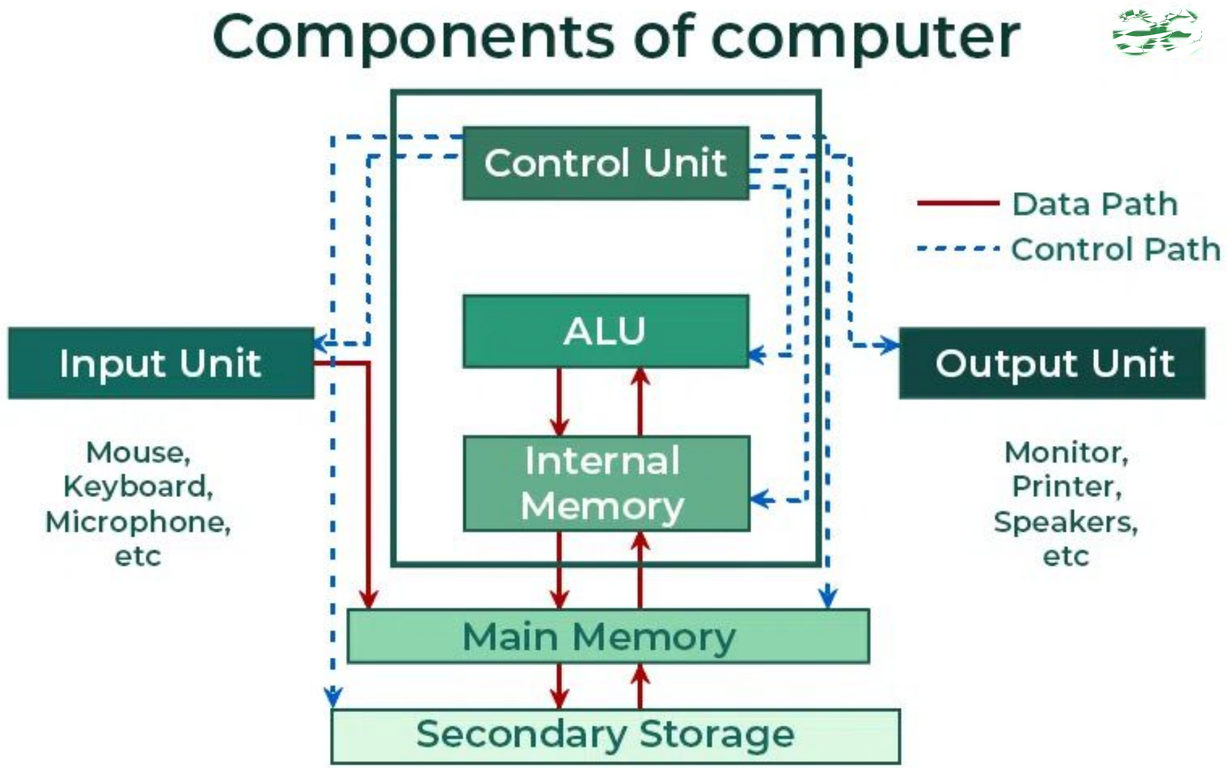
Flowcharts/Pseudocodes

Understand what is flowcharts and pseudocodes

Hands on

Gain hands on experience on simple Algorithmic tasks

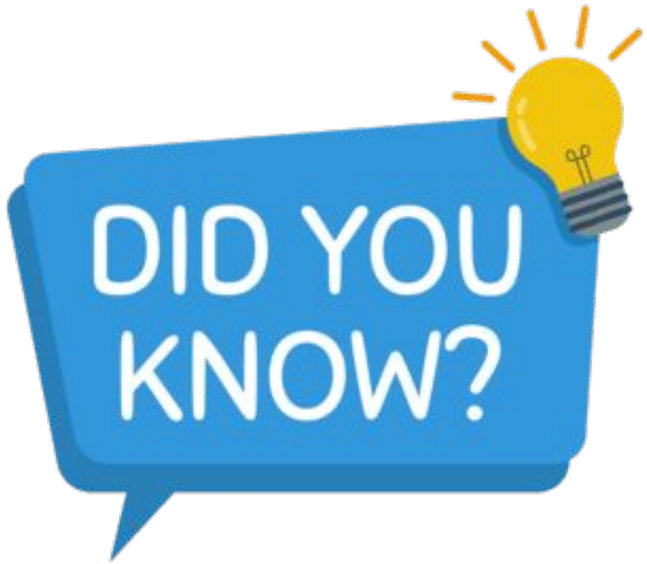
Components of a computer



Components of a computer

Welcome to Algorithms

What is an Algorithm?



Did you know, your morning routine is also an Algorithm?

Algorithms in daily life.

"Algorithms Are Everywhere! 🌍"

Examples:

- Social Media: How Instagram decides which posts to show you.
- Cooking: Following a recipe step-by-step.
- Travel: Using Google Maps to find the fastest route.

Real world algorithms example

"From Cooking to Coding 🍳💻"

Case Studies:

How Zomato uses algorithms to recommend restaurants?

NETFLIX

How Netflix suggests shows based on your viewing history?

Task automation

"Automating Everyday Tasks ⚙️"

Examples:

- Creating a to-do list in a task management app.
- Setting up automatic bill payments.
- Using Excel formulas to calculate expenses.

Flowcharts and Pseudocodes

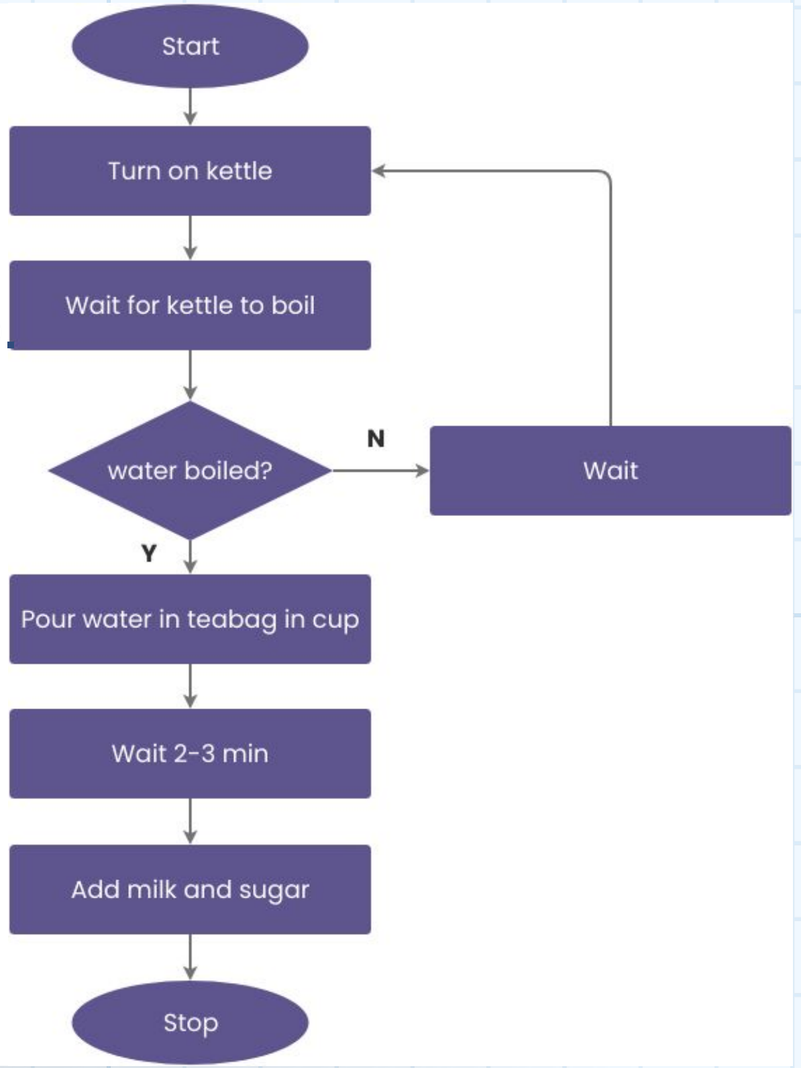
Visualizing algorithms

Flowcharts and Pseudocodes

Map your algorithms: Flowcharts

Basic Elements:

- Process Blocks: Represent tasks (e.g., "Turn on Kettle").
- Decision Diamonds: Represent choices (e.g., "water boiled?").
- Flow Arrows: Show the sequence of steps.
- Start/Stop Points: Mark the beginning and end of the process.



Flowcharts and Pseudocodes

"How Ola Plans Your Ride 🚗"

Complete Workflow:

a. The user opens the app.

b. App checks for nearby drivers.

c. The user selects a ride.

d. App calculates fare and ETA.

e. Ride is confirmed.

To do Activity:

Create a flowchart for this workflow.

From Flowcharts to Pseudocodes

"Turning Visuals into Code 💻"

Translation Process:

a. Write down each step in plain English.

b. Use simple commands (e.g., "If-Else" for decisions).

c. Test the logic to ensure it works.

Example: Pseudocode for booking a movie ticket online.

Interactive workshop

"Let’s Build a Flowchart Together!"

Group Exercise:

- Problem: Plan a school fest.
- Tasks: Break down the problem into steps (e.g., budget planning, event scheduling).

Outcome: Create a flowchart as a group.

Common pitfalls and solutions

"How to Avoid Pitfalls 🛑"

Problem-Solving / Algorithmic thinking Framework:

a. Identify the issue.

b. Analyze the root cause.

c. Develop a solution.

d. Implement and monitor the solution.

Recap

1. Algorithms are step-by-step solutions, from recipes to tech systems.
2. Visualizing algorithms through flowcharts.
3. How AI tools (like ChatGPT, Asana) help in task automation and decision-making.
4. Effective problem-solving and algorithmic thinking strategies.
5. Modern careers in data analysis, AI, and business consulting.

Thank you